



# Newtown Creek CWA/CERCLA Coordination

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Long Term Control Plan (LTCP) Path Forward  
August 15, 2017

1. Technical elements
  - 1a. Overview
  - 1b. Background / Baseline
  - 1c. LTCP Alternatives Analysis
  - 1d. LTCP Recommended Alternative
2. Timeline and Path Forward

## **1a. Overview**

# Water Quality Standards & LTCP Goals



## CLASS SD

### Fish Survival

The **best usage** of Class SD water is **fishing**. These waters shall be suitable for fish, shellfish, and wildlife survival. In addition, the water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.

Parameter	Criteria*	DEC Water Quality Parameter Reference
<b>Fecal Coliform</b>	Monthly Geometric Mean $\leq 200$ col/100 mL	<ul style="list-style-type: none"><li>• New York Codes, Rules and Regulations</li><li>• (NYCRR Part 703.4)</li></ul>
<b>Total Coliform</b>	Monthly Geometric Mean $\leq 2,400$ col/100 mL 80% $\leq 5,000$ col/100 mL	<ul style="list-style-type: none"><li>• New York Codes, Rules and Regulations</li><li>• (NYCRR Part 703.4)</li></ul>
<b>Dissolved Oxygen</b>	$\geq 3.0$ mg/L (acute, never less than)	<ul style="list-style-type: none"><li>• New York Codes, Rules and Regulations</li><li>• (NYCRR Part 703.3)</li></ul>

\* EPA has also proposed a potential future RWQC for enterococcus: 30-Day Rolling GM  $\leq 30$  col/100 mL.

## ➤ CSO LTCP Goals and Targets:

- Recreation Season Bacteria Compliance
- Annual Dissolved Oxygen Compliance
- Time to Recovery for Bacteria of  $\leq 24$  hours
- Floatables Control

# LTCP Recommended Plan

**1**

Expansion of Borden Avenue Pump Station from 2 MGD to 26 MGD and construction of wet weather force main to Kent Avenue

**BB-026**

BB-026	Baseline Conditions	Recommended Plan
Annual CSO Volume	120	30
Seasonal Activations	20	13
Annual Activations	37	25

**2**

Elimination of Aeration System for Dutch Kills & Main Trunk

**3**

Construction of Deep Rock CSO Tunnel to capture 62.5% of CSO volume from CSO Outfalls NCQ-077, NCB-083, & NCB-015

**NCQ-077**

NCQ-077	Baseline Conditions	Recommended Plan
Annual CSO Volume	300	100
Seasonal Activations	22	13
Annual Activations	41	19

**NCB-083**

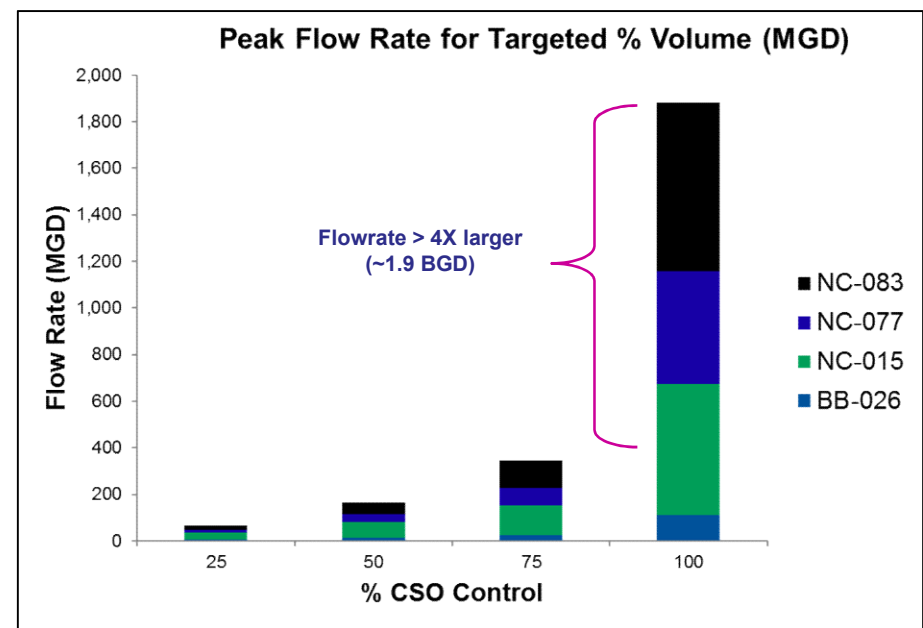
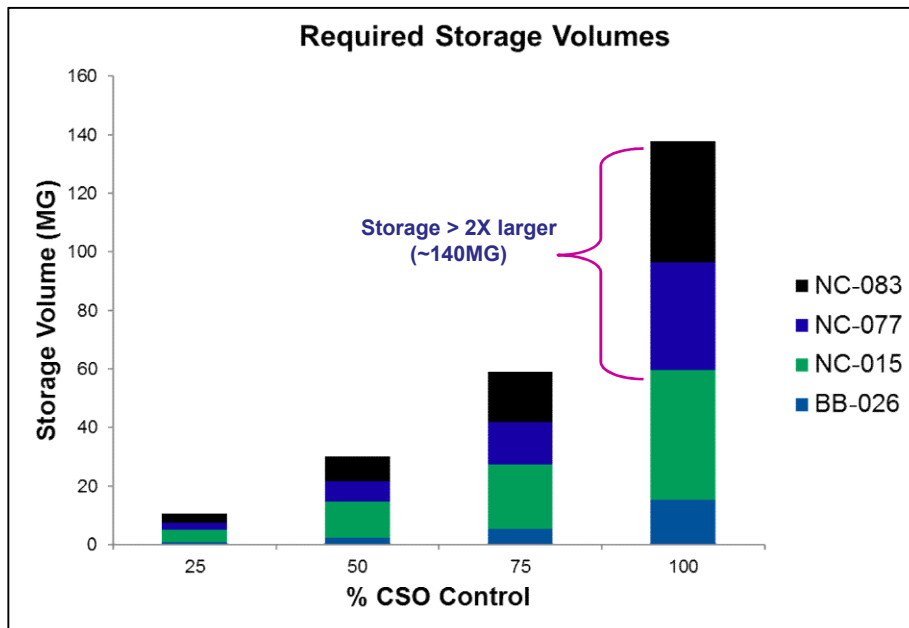
NCB-083	Baseline Conditions	Recommended Plan
Annual CSO Volume	315	115
Rec. Season Activations	24	9
Annual Activations	42	12

**NCB-015**

NCB-015	Baseline Conditions	Recommended Plan
Annual CSO Volume	321	120
Seasonal Activations	17	9
Annual Activations	31	13

# Benefits of Recommended Plan

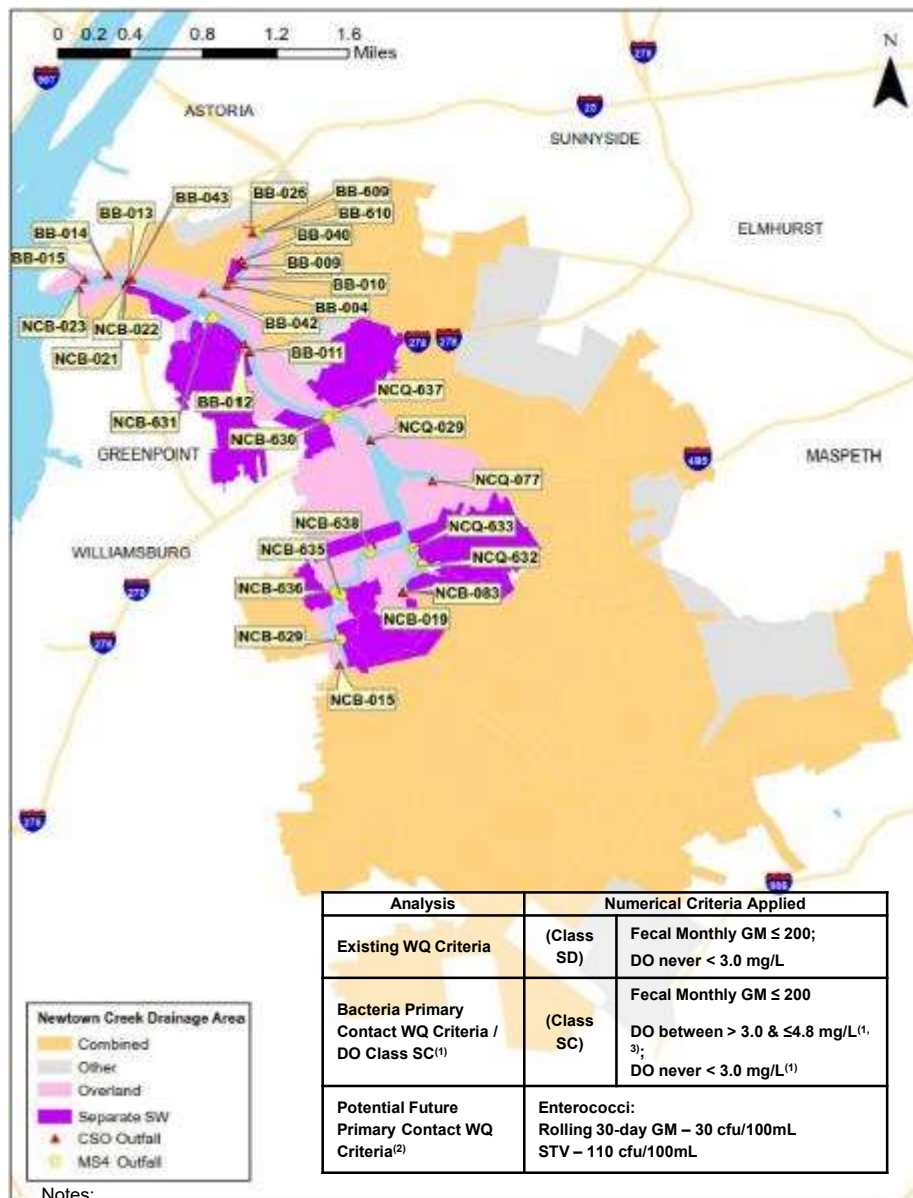
- ❖ Plan is projected to fully attain the Clean Water Act WQ bacteria criteria for the rec. season
- ❖ Most cost-effective alternative based on analysis consistent with EPA's CSO Control Policy
- ❖ Recommended plan significantly reduces volume and frequency of CSO events
- ❖ Decoupling Dutch Kills Pump Station from CSO Storage Tunnel allows for shorter implementation schedule to attain targeted WQ improvements in Dutch Kills
- ❖ Significant hurdles for projects sized beyond recommended plan:
  - Exponential increase in cost and size of projects to capture major events (i.e. Sandy, Irene)
  - NC WWTP capacity limited to treat pump-back flow thus requiring new satellite facilities
  - Marginal improvements in WQ from projects beyond recommended plan, 100% CSO control would not fully attain existing CWA WQ Criteria for bacteria on an annual basis



## **1b. Background / Baseline**



# Newtown Creek Watershed Characteristics



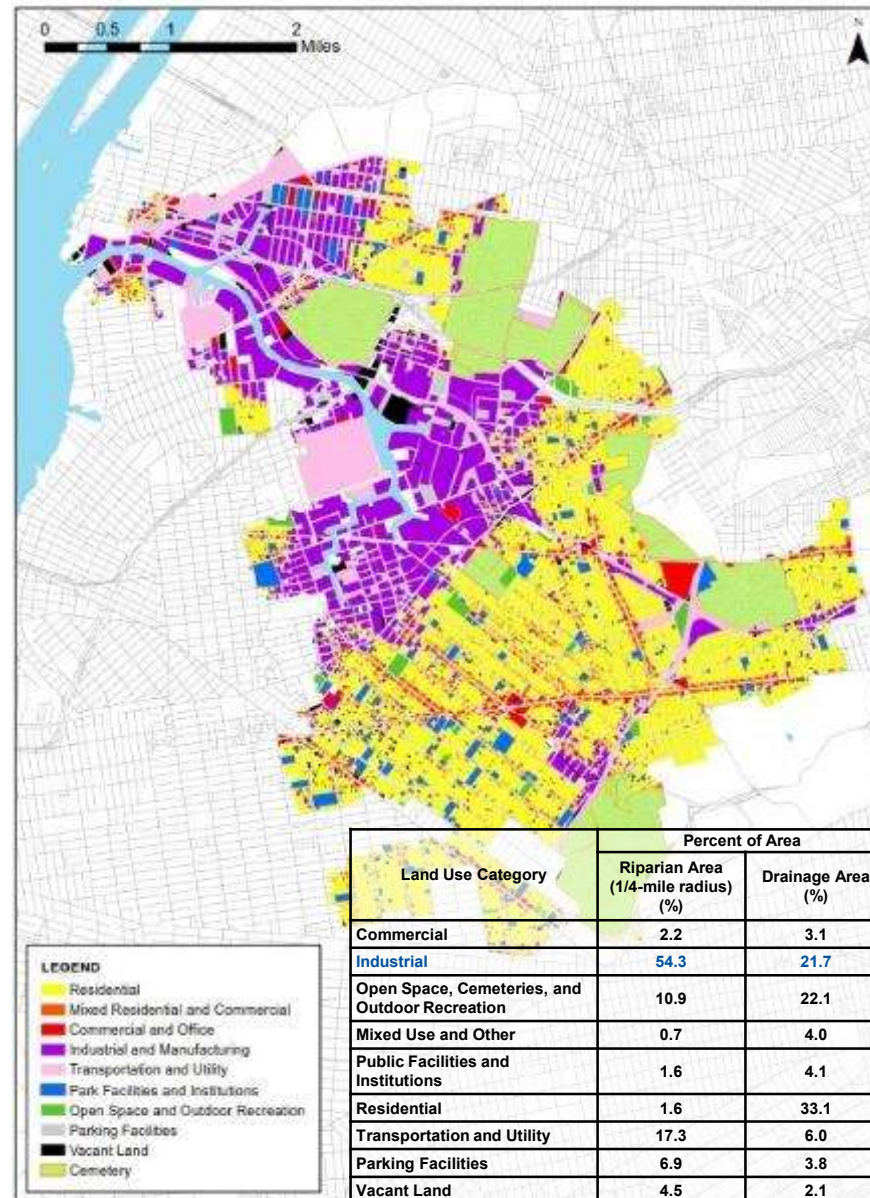
## Notes:

GM = Geometric Mean; STV = 90 Percent Statistical Threshold Value

(1) This water quality classification is not assigned to Newtown Creek.

(2) DEC has not adopted the Potential Future Primary Contact WQ Criteria.

(3) This is an excursion based limit that allows for the average daily DO concentrations to fall between 3.0 and 4.8 mg/L for a limited number of days



- The industrial areas surrounding Newtown Creek are designated by the City as NYC Industrial Business Zones; established to protect existing manufacturing districts and encourage industrial growth citywide.



# Newtown Creek Baseline CSO Mitigation

	Recommended Project	Construction Cost	Status
1	Brooklyn/Queens Pump Station at Newtown Creek WWTP	\$300 M	Completed
2	Bending Weirs and Underflow Baffles	\$42 M	In-Construction thru 2017
3	In-Stream Aeration Projects	\$30 M <sup>1</sup>	In-Construction thru 2018
4	Built and Planned GI Projects	\$45 M <sup>2</sup>	Ongoing Design and Construction
<b>Total</b>		<b>= \$417 M</b>	

1) Includes Upper and Lower English Kills and East Branch Aeration

2) Cost to date, more GI projects may be pending.

**2**

- Construction Completion: Dec. 2017
- Volume Reduction: 62 MGY
- Provides Floatables Control
- Being installed at NCB-015, NCQ-077, NCB-083, BB-026

**3**

Contract	Aeration Location	Construction Completion	Cost
<b>EK-11</b>	Upper English Kills	Dec. 2008	\$9 M
<b>CSO-NC-2</b>	Lower English Kills	Jan. 2014	\$2.2 M
<b>CSO-NC-3</b>	East Branch	Jun. 2018	\$18 M

Note:  
Dutch Kills aeration is not included in the LTCP Baseline Conditions and is proposed to be eliminated as part of the Newtown Creek LTCP

**1**

- PS Wet Weather Capacity = 400 MGD
- includes 5 new MSPs, headworks upgrade, In-line storage facility, odor control

**4**

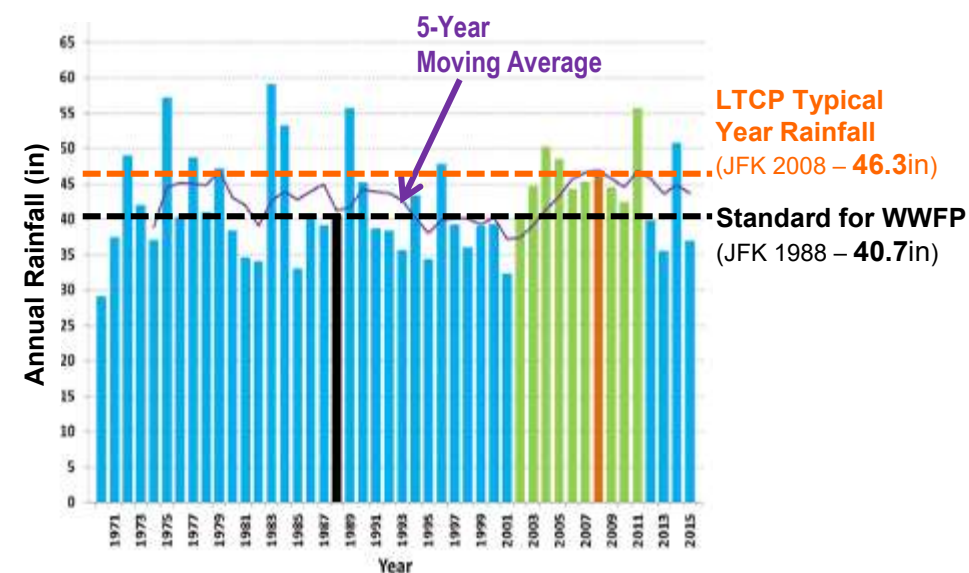
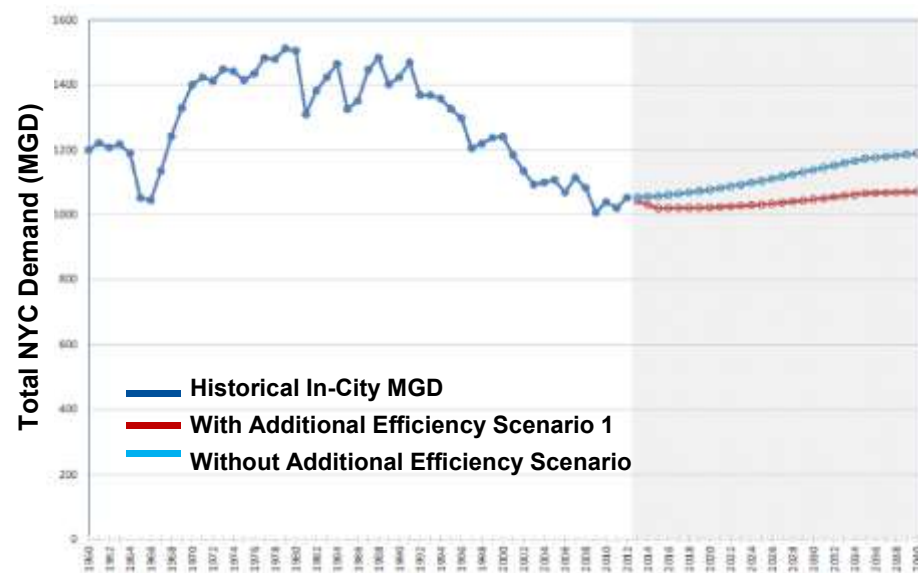
**Legend**

- Waterbodies
- CSO Outfalls
- CSO Outfall Watersheds
- Constructed
- In Construction
- Planned

- More than 1,300 GI assets within streets, parks, and schools
- 98% are ROW Raingardens (aka bioswales)
- Design resources for public onsite only in NCB-015 & NCB-083
- Other areas will be assessed in 2017 with design resources citywide available in 2018

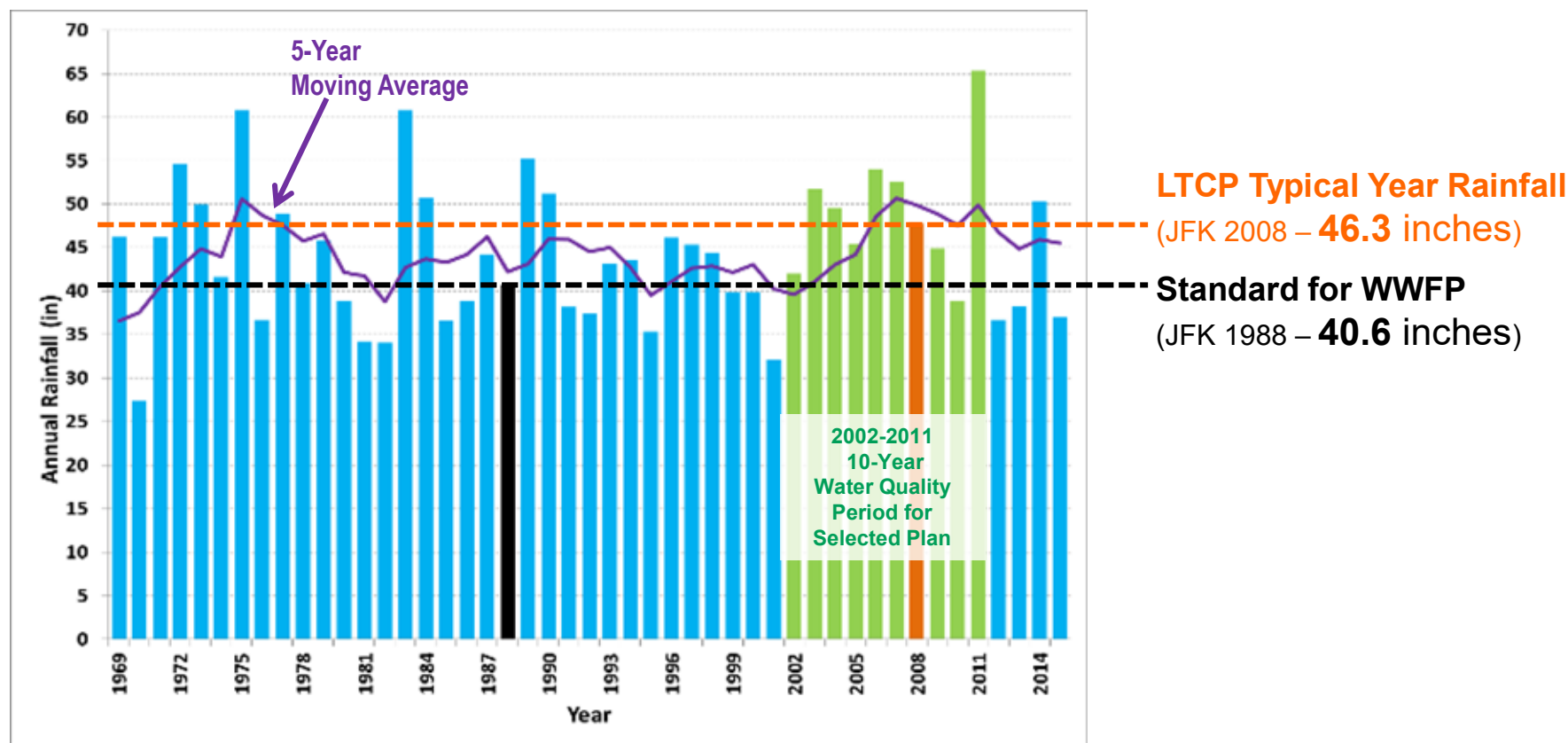
# LTCP Baseline Conditions

- Baseline CSO Projects (**Grey** & **Green**)
- 2040 Projected Sanitary Flows that account for water conservation trends
- Satellite Flyover Impervious Data in conjunction with an extensive **peer reviewed** flow monitoring program
- Selection of 2008 as Typical Rainfall Year based on extensive assessment of historical data:
  - 42 years of rainfall data analyzed from 4 NOAA Gauges
  - JFK 2008 best representation of annual rainfall volume including projected climate change
  - For recommended LTCP plan, 10 years of data used to further assess attainment (2002-2011)
  - 2008 Typical Rainfall Year used for all NYC LTCPs

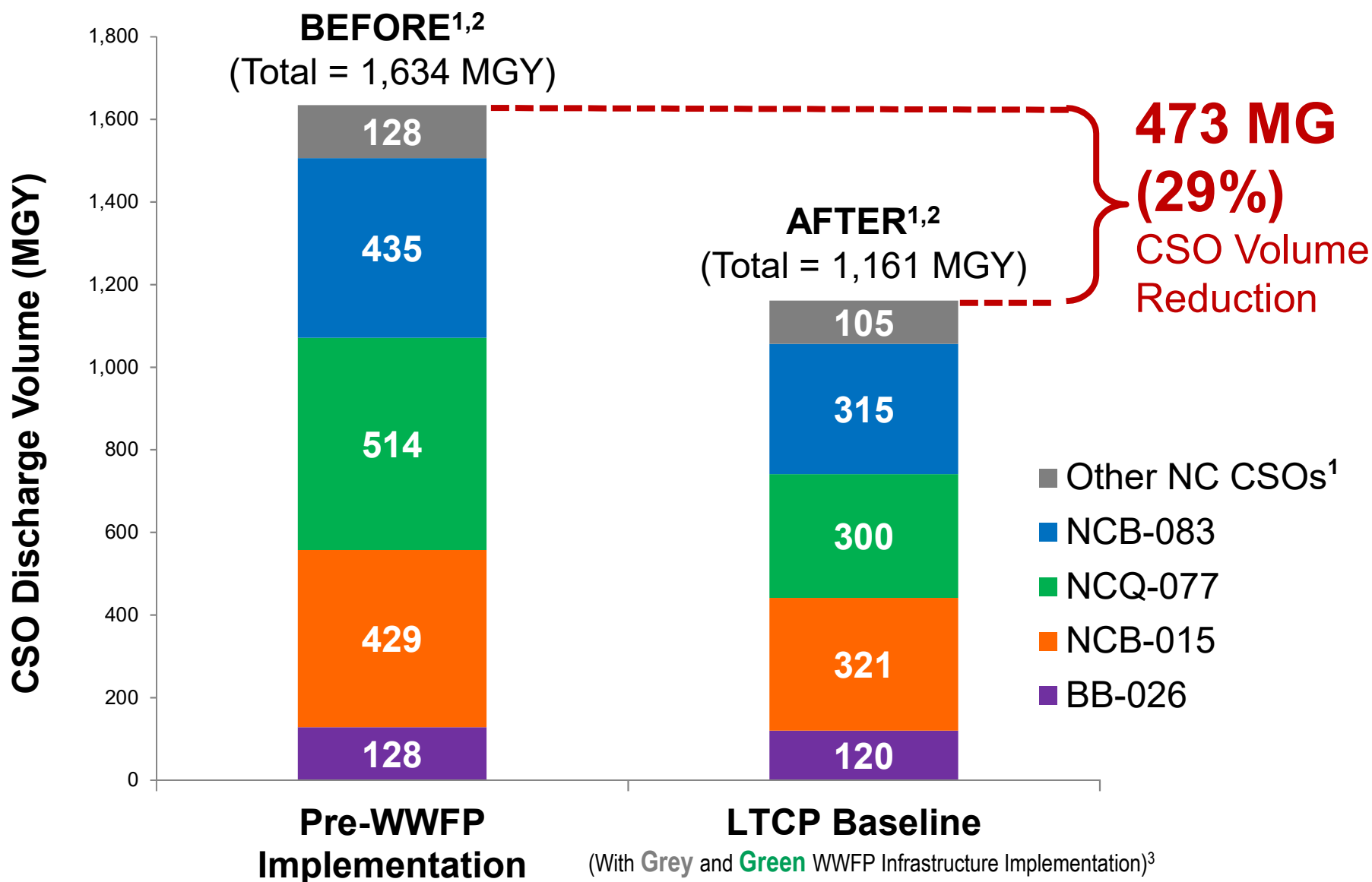


# Model Calibration, Updates, and Peer Review

- Water Quality Model calibrated with Harbor Survey and LTCP sampling data (**peer review**)
- Landside InfoWorks Model calibrated with LTCP flow and sampling data (**peer review**)
- Future wastewater flows based on **2040 population** projections
- Recalibrated 2012 InfoWorks based on **revised impervious areas**
- Screening of alternatives based on 1-yr data (JFK 2008 “Typical Year Rainfall”)
- Selected Plan Model runs based on 10-yr data (2001 to 2011) to address elevated rainfall amount due to **climate change**



# CSO Reductions Under Baseline Conditions



1) Other Newtown Creek CSOs include 17 other CSO outfalls in the NC and BB drainage areas that discharge into Newtown Creek

2) All CSO volumes were calculated using JFK 2008 rainfall in conjunctions with 2040 sanitary flows and satellite flyover impervious data

3) GI includes a 1.5% GI application rate on public properties and a 3% application rate on private property

# LTCP Baseline Wet Weather Loads

## Bowery Bay WWTP (LL Interceptor)

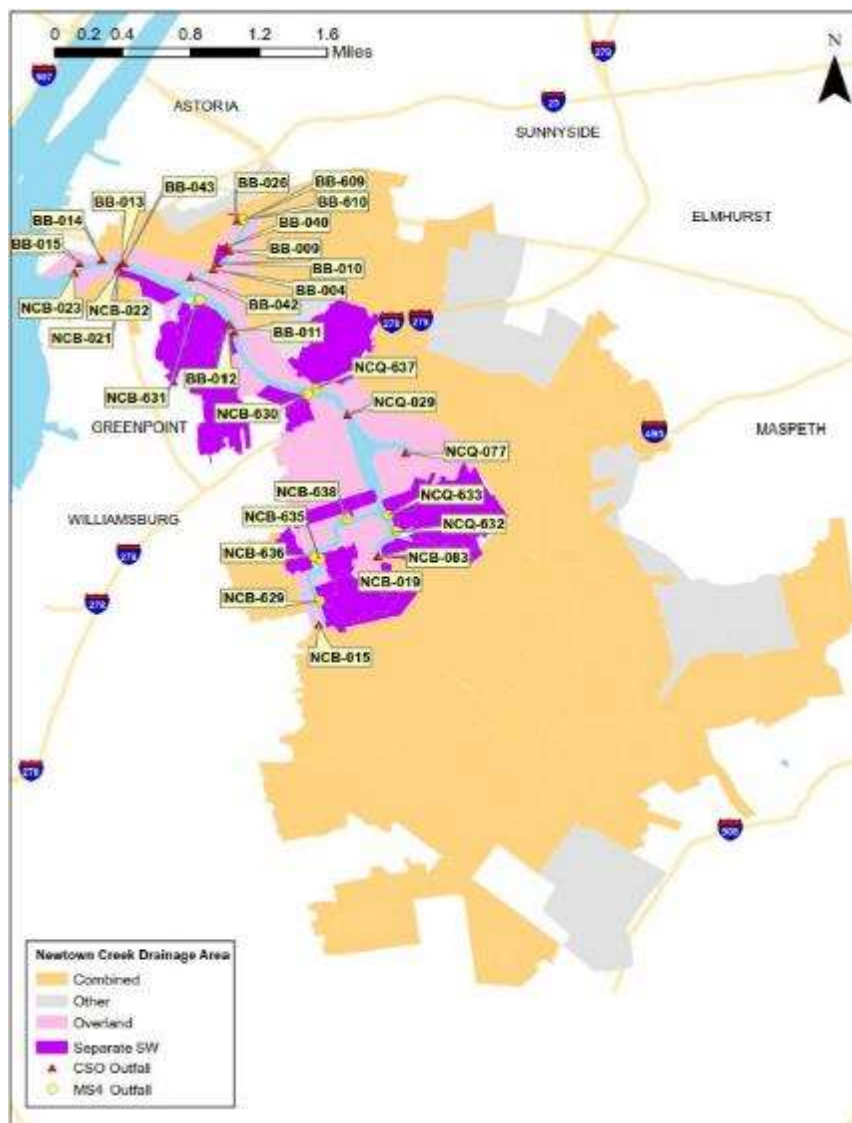
Outfall	Volume (MG)	Freq.
BB-004	0	1
BB-009	43	34
BB-010	1	7
BB-011	2	14
BB-012	0	1
BB-013	16	31
BB-014	2	18
BB-015	1	13
<b>BB-026</b>	<b>120</b>	<b>37</b>
BB-040	1	16
BB-042	2	22
BB-043	9	32
BB-049	0	0
<b>Sub-Total</b>	<b>196</b>	<b>37</b>

## Newtown Creek WWTP

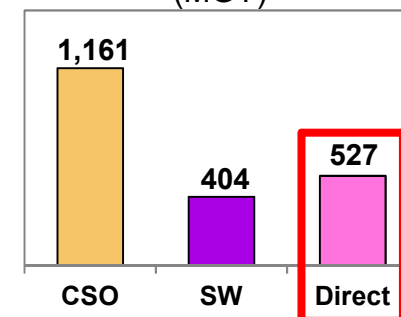
Outfall	Volume (MG)	Freq.
<b>NCB-015</b>	<b>321</b>	<b>31</b>
NCB-019	3	21
NCB-021	0	0
NCB-022	7	29
NCB-023	0	8
NCQ-029	19	40
<b>NCQ-077</b>	<b>300</b>	<b>41</b>
<b>NCB-083</b>	<b>314</b>	<b>42</b>
<b>Sub-Total</b>	<b>965</b>	<b>42</b>

**NCB-015 + NCB-083 + NCQ-077 + BB-026 = 91% of Total Annual Volume**

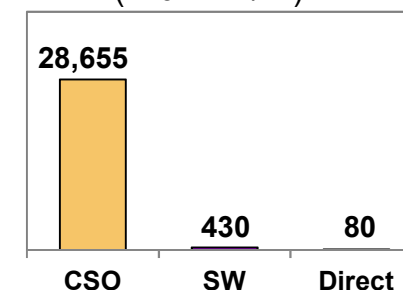
## DRAINAGE AREA LEGEND:



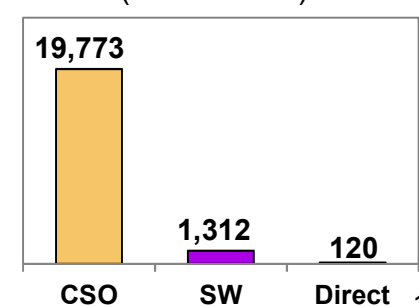
## Annual Volume (MGY)



## Annual Fecal Load (x10<sup>12</sup> cfu/Yr)



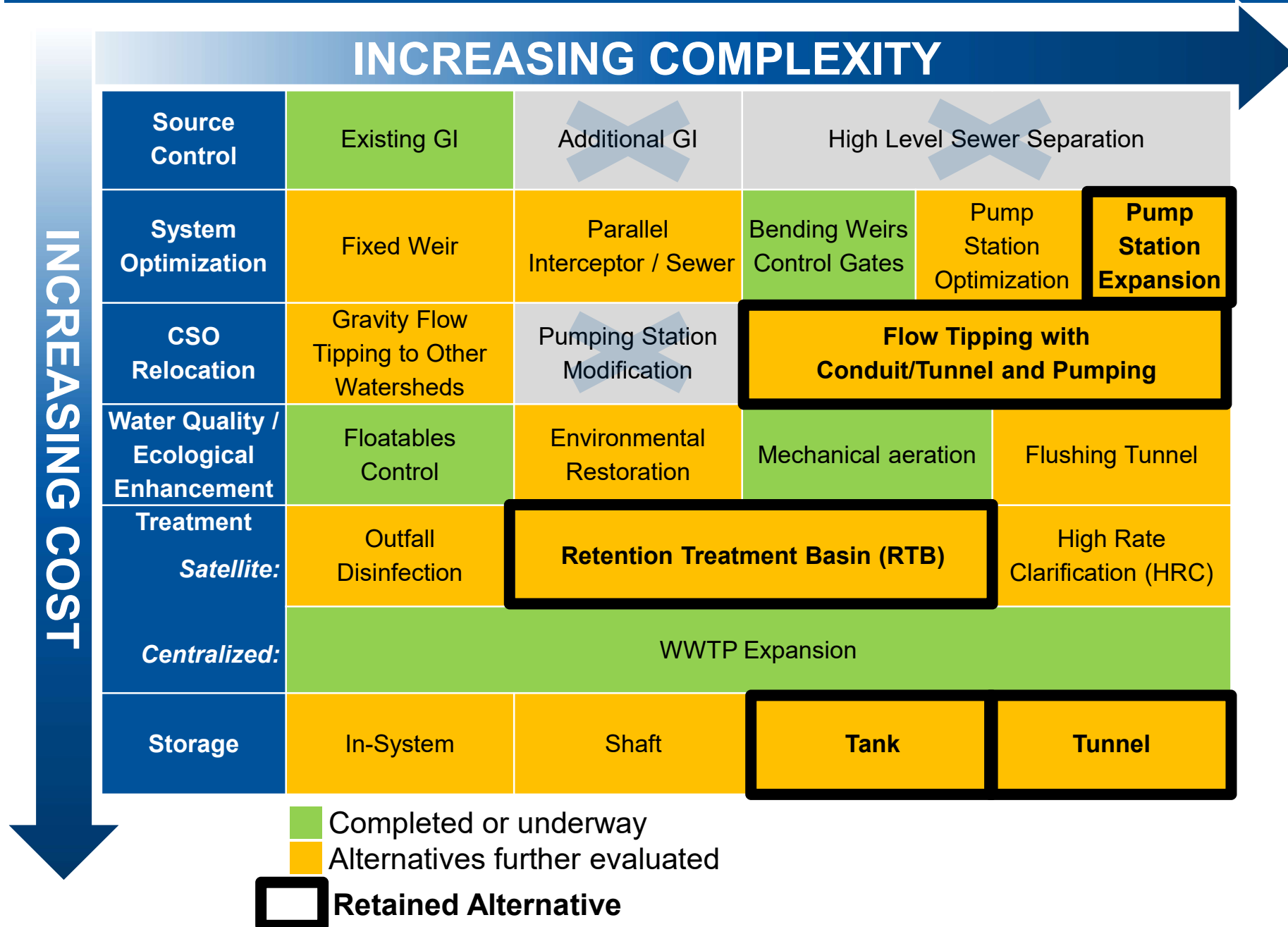
## Annual Enteric Load (x10<sup>12</sup> cfu/Yr)



## **1c. LTCP Alternatives Analysis**



# Newtown Creek Alternatives Toolbox

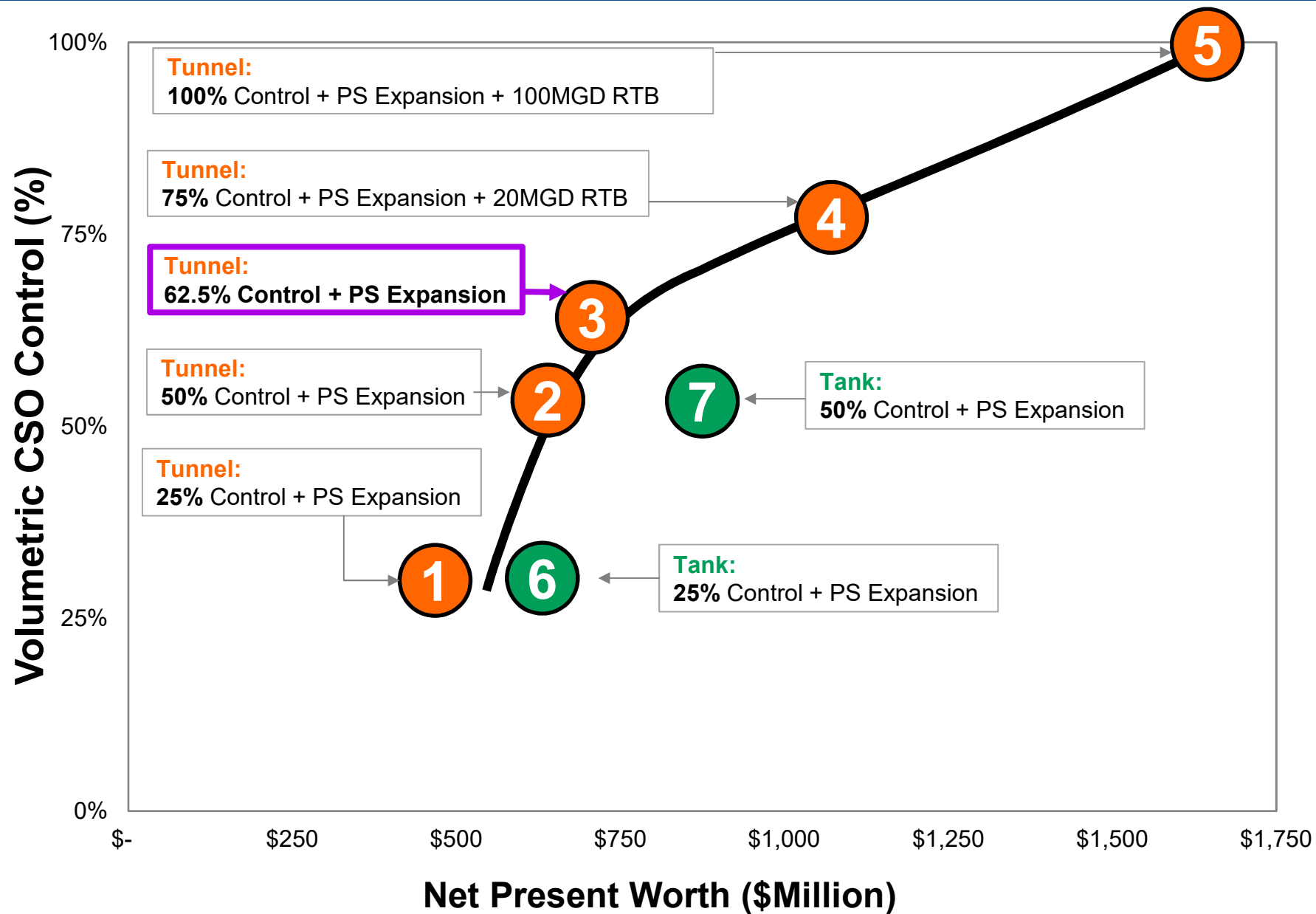


# Summary of Retained Alternatives

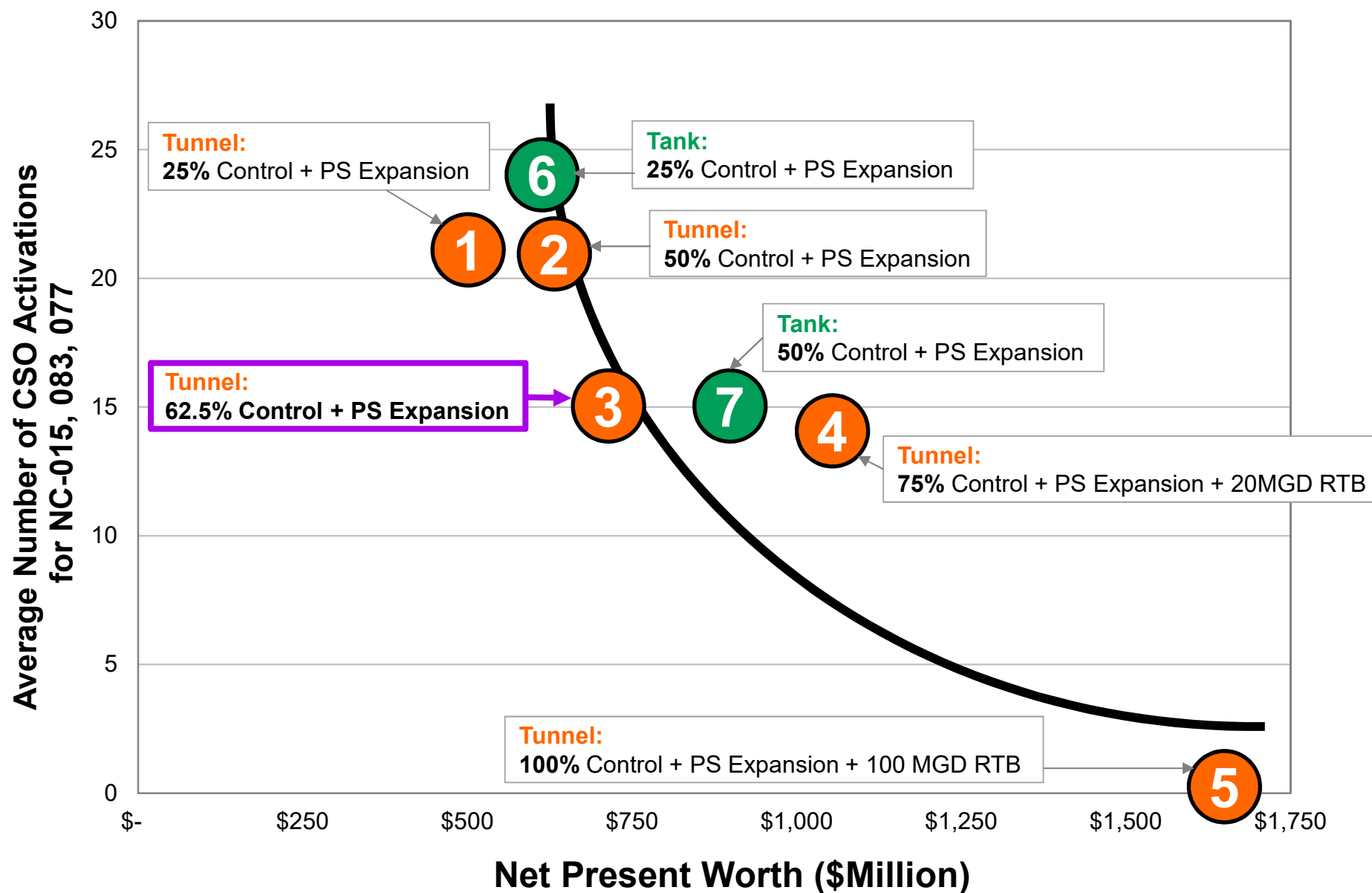
	Storage Option	%Control	Add-Ons	Remarks	Net Present Worth (\$Million)
1	Tunnel	25%	PS*	Diam. = 16 ft. Length = 7,570 to 9,980 ft.	\$527 M
2		50%	PS*	Diam. = 16 to 26 ft. Length = 7,570 to 18,800 ft.	\$647 M
3		62.5%	PS*	Diam. = 19 to 30 ft. Length = 7,570 to 18,800 ft.	\$730 M
4		75%	PS* + RTB satellite facility	Diam. = 23 to 26 ft. Length = 7,570 to 18,800 ft. RTB = 20 MGD	\$1,063 M
5		100%	RTB satellite facility	Diam. = 16 ft. Length = 7,570 to 9,980 ft. RTB = 100 MGD	\$1,650 M
6	Tank	25%	PS*	NC-077 = 2.4 MG Tank NC-083 = 3.0 MG Tank NC-015 = 4.3 MG Tank	\$627 M
7		50%	PS*	NC-077 = 6.9 MG Tank NC-083 = 8.5 MG Tank NC-015 = 12.3 MG Tank	\$901 M

\*Note: Probable bid cost for 26MGD Borden Pump Station Expansion = \$50M, All costs shown reflect the max. estimate of multiple sub-options. 16

# Performance of Retained Alternatives



# Performance of Retained Alternatives



# Dutch Kills: Attainment at NC-6



# Maspeth Creek: Attainment at NC-10





# East Branch: Attainment at NC-12



# English Kills: Attainment at NC-14



## **1d. LTCP Recommended Alternative**

# Projected WQ Improvements from Baseline

Station		Baseline Conditions <sup>(1)</sup>			Recommended Plan <sup>(2)</sup>		
		Fecal Coliform % Attainment (Monthly GM <200 cfu/100mL)		DO % Attainment (≥ 3.0 mg/L)	Fecal Coliform % Attainment (Monthly GM <200 cfu/100mL)		DO % Attainment (≥ 3.0 mg/L)
		Annual	Recreational <sup>(2)</sup>	Annual	Annual <sup>(3)</sup>	Recreational <sup>(1)</sup>	Annual
Main Channel	NC4	75	100	100	83	100	100
	NC5	75	100	100	83	100	100
Dutch Kills	NC6	50	83	98	83	100	99
Main Channel	NC7	75	100	100	83	100	100
	NC8	50	83	100	83	100	100
	NC9	50	83	99	83	100	100
Maspeth Creek	NC10	42	67	96	83	100	100
English Kills	NC11	42	67	95	83	100	100
East Branch	NC12	42	67	95	83	100	100
English Kills	NC13	42	67	94	83	100	100
	NC14	42	67	90	83	100	96

Notes:

(1) JFK 2008 Rainfall

(2) The Recreational Season is from May 1st through October 31st.

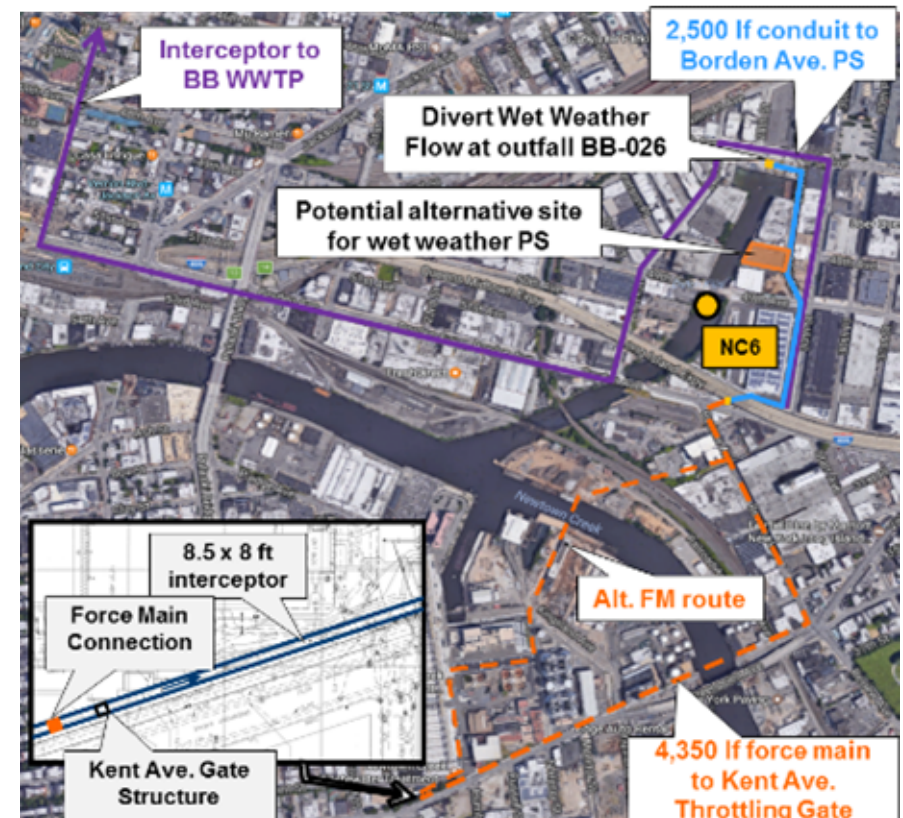
(3) December and February only months in non-attainment that occur during non-recreational season

# 1 Borden Avenue Pump Station Expansion

- Expansion of existing Borden Ave Pumping Station from 3 MGD to 26 MGD
- Most cost-effective alternative for reducing CSOs to Dutch Kills

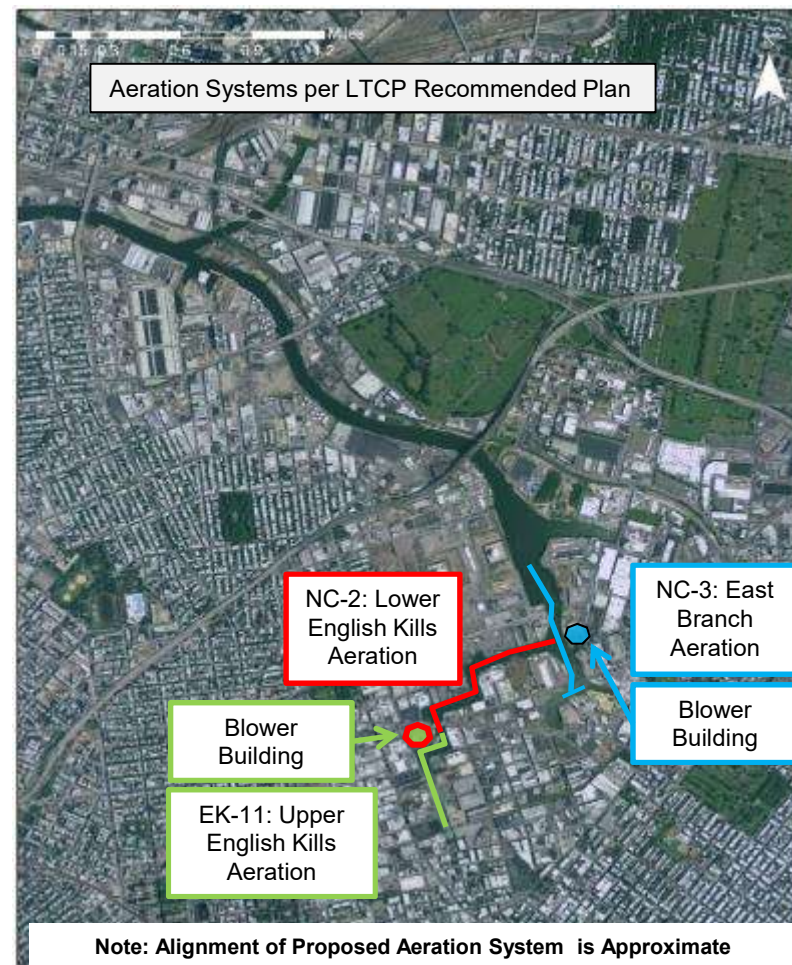
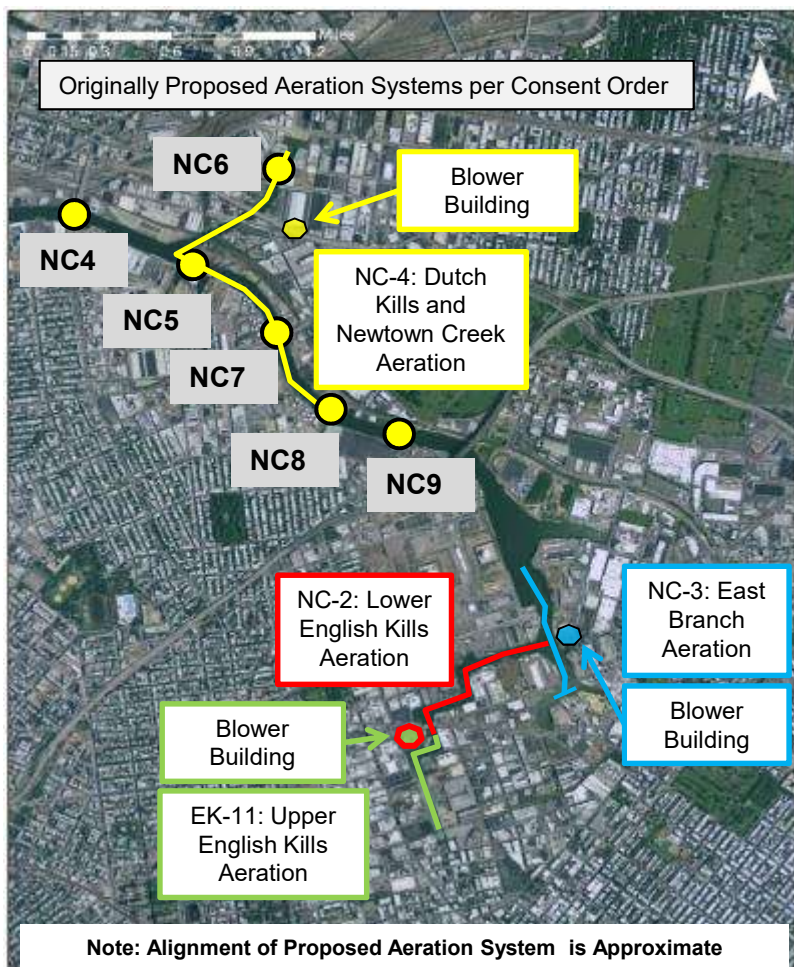
Station NC6	2008 Seasonal Fecal % Attainment	2008 Seasonal Entero % Attainment
Baseline	83%	90%
75% Control	100%	99%

Outfall BB-026	Annual CSO Volume (MGY)	Annual Activation Frequency	Seasonal Activation Frequency
Baseline	120	37	20
75% Control	30	25	13





## 2 Newtown Creek Aeration Systems

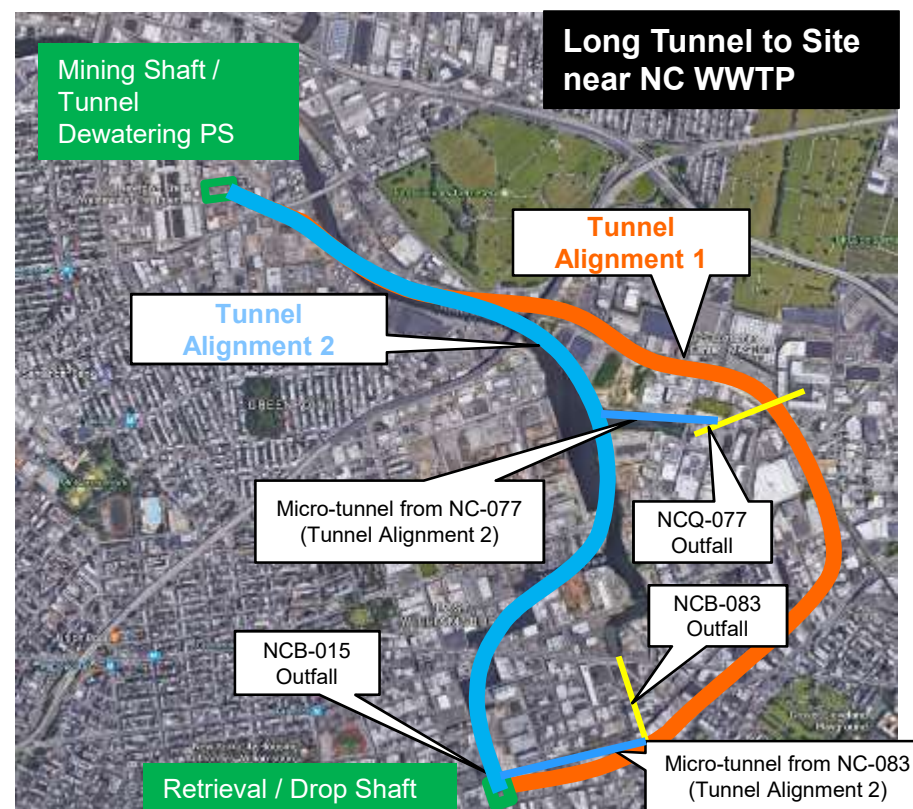
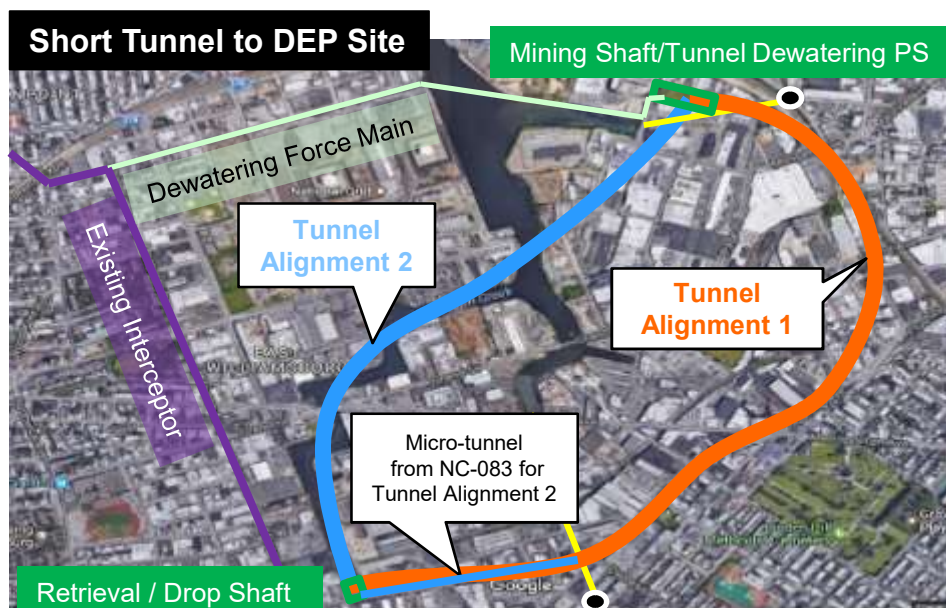


- LTCP recommended plan is projected to attain DO standards >98% of the time and significantly reduce area of Newtown Creek that will have seasonal aeration.
- Seasonal aeration is still necessary in English Kills and East Branch



### 3 Tunnel Alignment Options

#### ➤ 62.5% Control Deep Tunnel for Outfalls NC-015, NC-083 and NC-077



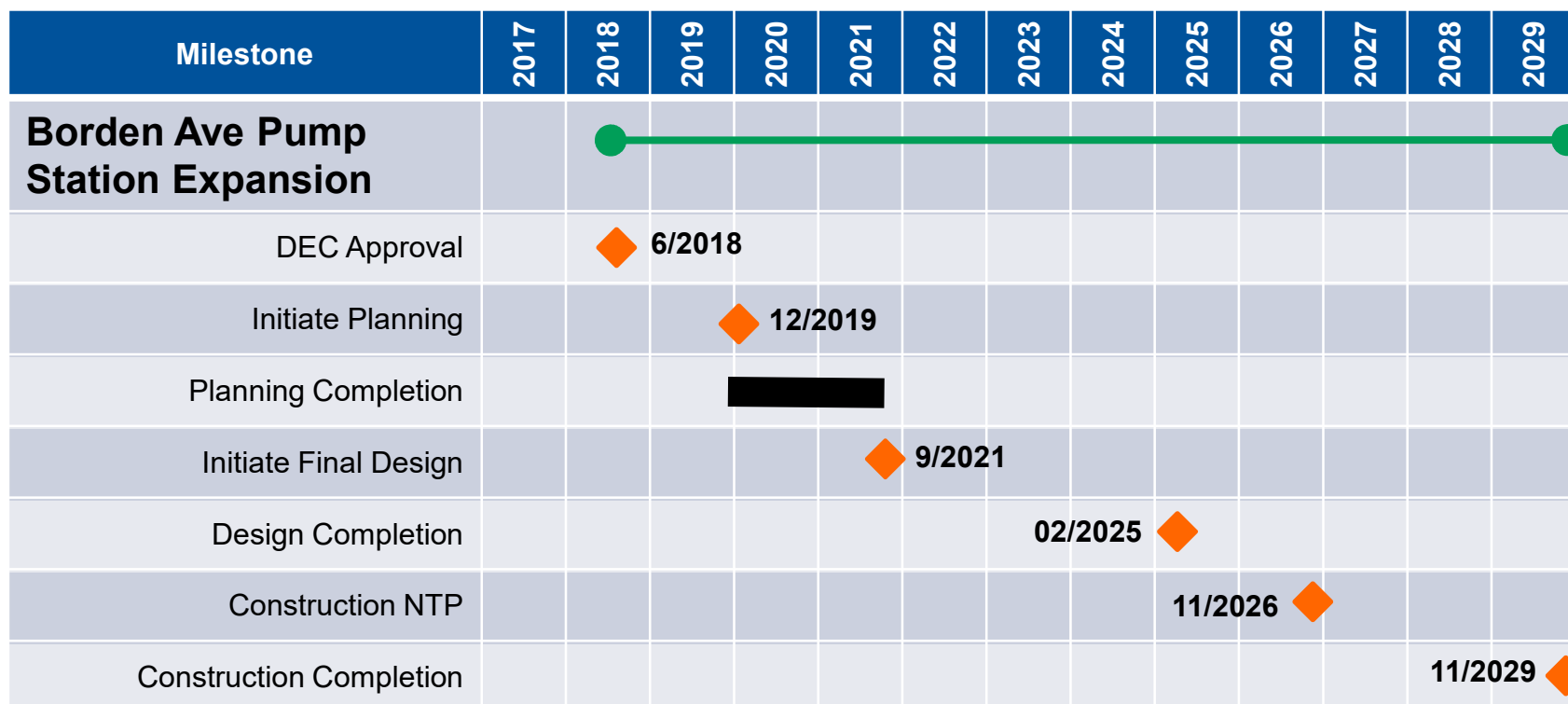
Short Tunnel to DEP Site	Tunnel Length (ft)	Selected Tunnel Diameter (ft)	Storage Volume Provided (MG)	PS Capacity (MGD)
Alignment 1 (ROW)	9,980	26	39	39
Alignment 2 (In-Creek)	7,570	30	39	39

Long Tunnel to Site near NC WWTP	Tunnel Length (ft)	Selected Tunnel Diameter (ft)	Storage Volume Provided (MG)	PS Capacity (MGD)
Alignment 1 (ROW)	18,800	19	39	39
Alignment 2 (In-Creek)	13,700	22	39	39

## **2. Timeline and Path Forward**

# Borden Ave Pump Station Expansion Schedule

- P80 Probabilistic Schedule, factoring in likelihood and impact of schedule risks based on projected DEC approval by **June 2018**



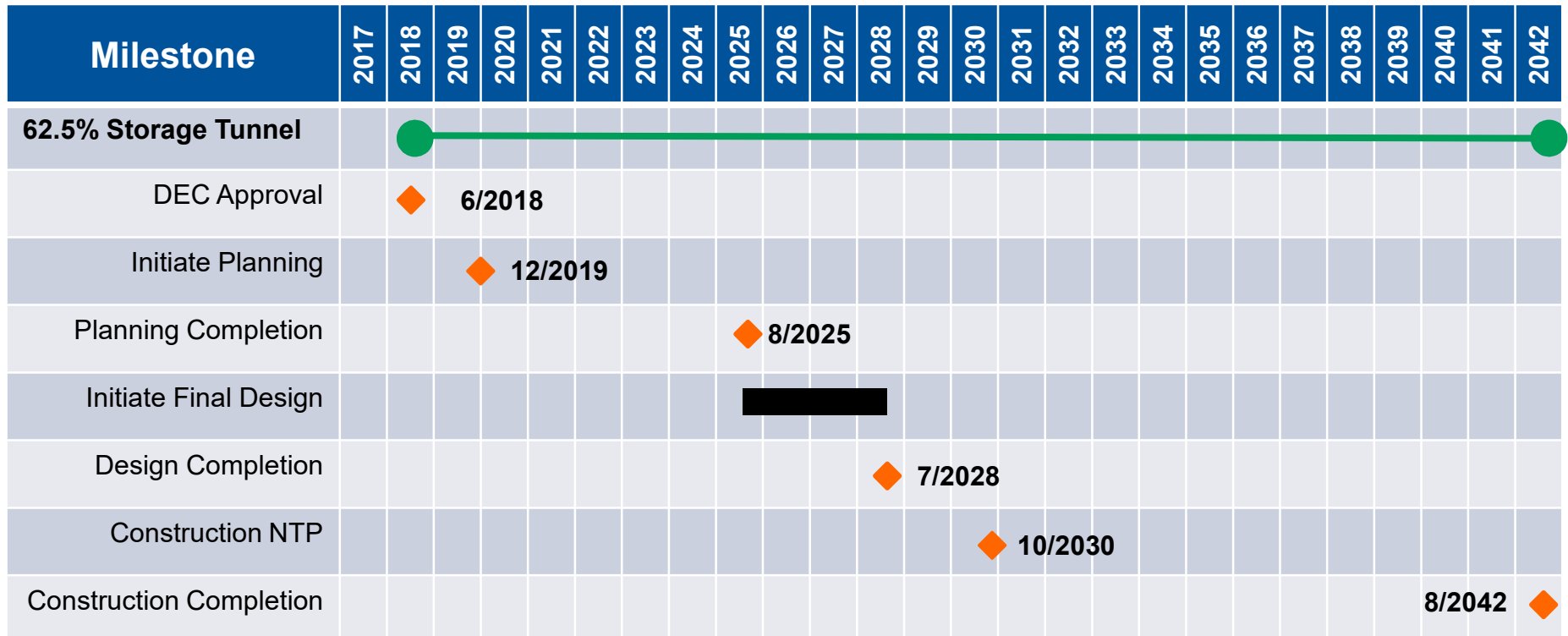
- Probable Bid Costs (2017 dollars) = \$50 M
- Escalated Design and Construction Costs = \$85 M
- “Floating” Timeline from Plan Approval

## Potential Construction Risks:

- Unanticipated soil conditions (diversion structure, influent gravity sewer, force main)
- Utility crossings may be more difficult than expected (influent gravity sewer, force main)
- Unanticipated interferences with bulkhead restoration (influent gravity sewer, force main)
- Difficulties in constructing creek crossing (force main)

# 62.5% CSO Control Tunnel Schedule

- P80 Probabilistic Schedule, factoring in likelihood and impact of schedule risks based on projected DEC approval by 6/2018



- Probable Bid Costs (2017 dollars) = \$547 M
- Escalated Design and Construction Costs\* = \$1,223 M
- “Floating” Timeline from Plan Approval
- Extended Facility Planning required for environmental assessments, alignment selection and to secure properties

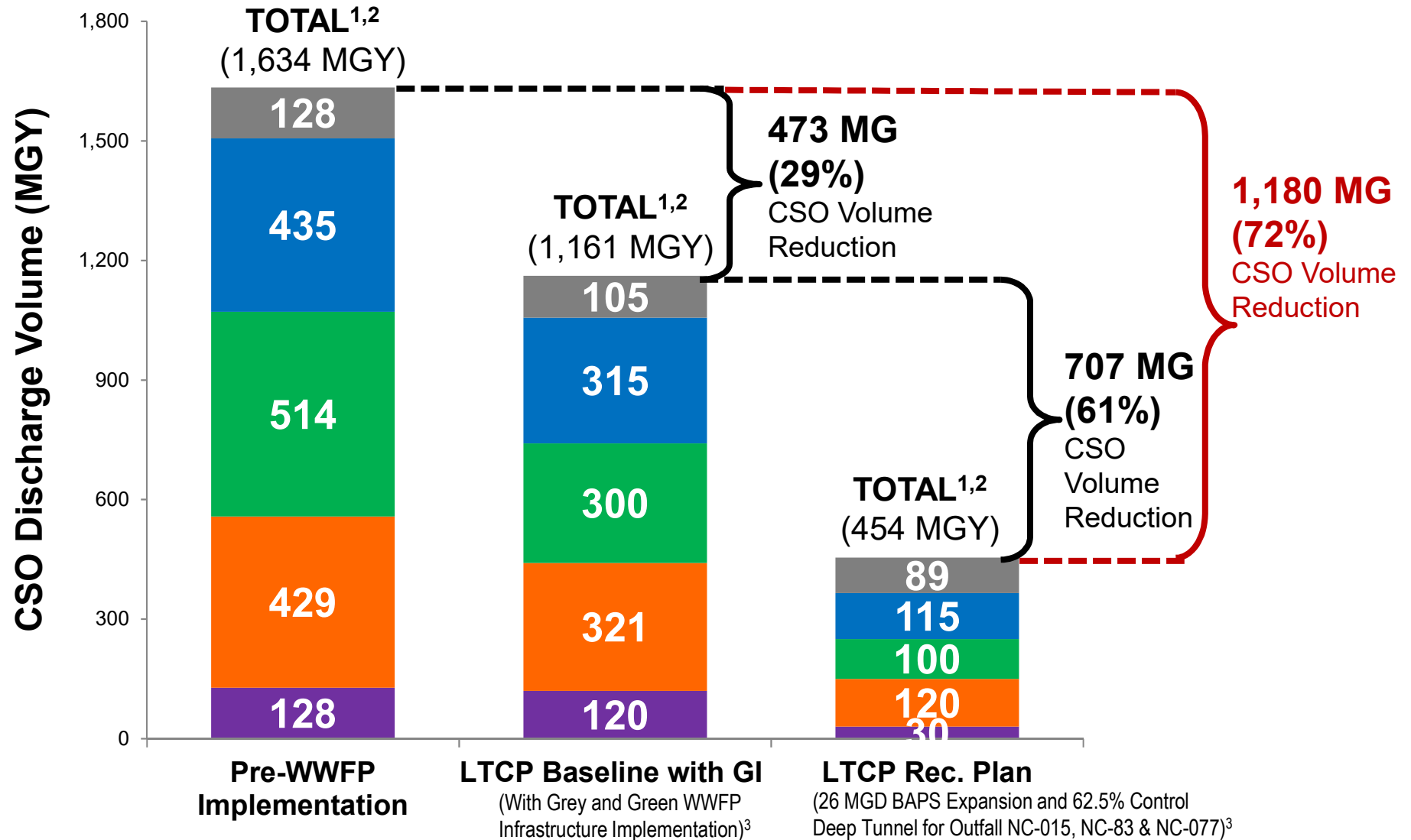
## Potential Construction Risks:

- Unfavorable geology at shafts or along tunnel alignment
- Tunnel alignment change required
- TBM main bearing failure
- Site acquisition costs and delays
- Existing outfalls need repair prior to connection to shafts

**\*Note:** Costs do not include potential property acquisition

# CSO Volume Reductions

■ BB-026 ■ NCB-015 ■ NCQ-077 ■ NCB-083 ■ Other NC CSOs<sup>1</sup>



1) Other Newtown Creek CSOs include 17 other CSO outfalls in the NC and BB drainage areas that discharge into Newtown Creek

2) All CSO volumes were calculated using JFK 2008 rainfall in conjunctions with 2040 sanitary flows and satellite flyover impervious data

3) GI includes a 1.5% GI application rate on public properties and a 3% application rate on private property

# NYC Newtown Creek CSO Project Summary



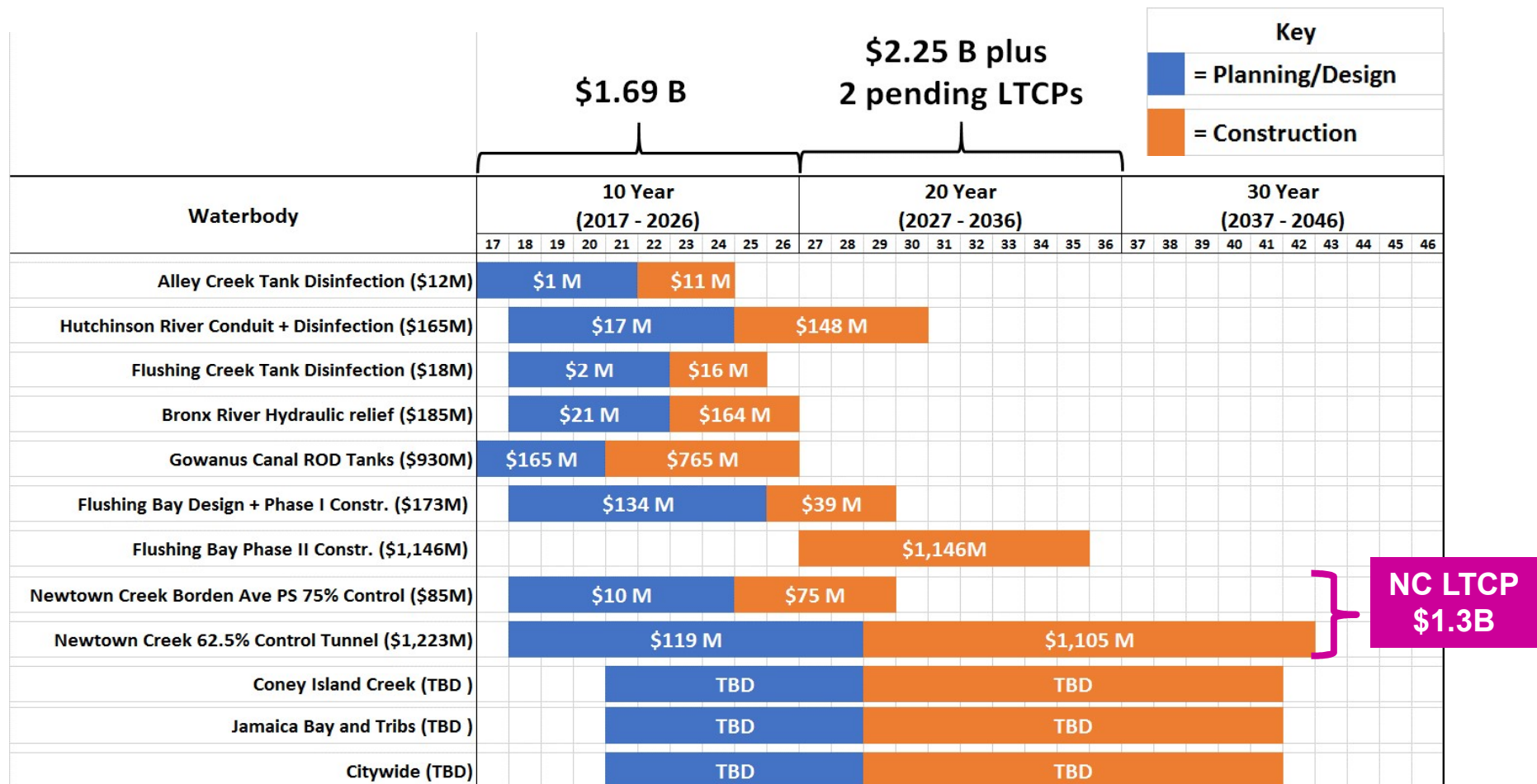
CSO Program	Costs
Waterbody Watershed Facility Plan Projects (with GI) (Committed Costs)	\$417M
LTCP Recommended Plan (Escalated Costs)	~1.3B
<b>Total:</b>	<b>~1.7Billion</b>

- InfoWorks Point Source and Hydrodynamic Models are **complete, calibrated, and peer reviewed**
  - Ongoing work on Sediment/Contaminant Fate and Transport
- CSO reduced by over 1B gallons (72%) from pre-WBWS FP conditions
- 100% Clean Water Act attainment for fecal coliform 10 months of the year
- 96-100% Clean Water Act attainment for dissolved oxygen annually
- CSO activations reduced by half:
  - Annually ~32 to ~15
  - Rec. Season ~20 to ~10



# Summary of CSO LTCP Program Costs

- DEP has encumbered about \$2.5B to date and has an additional \$1.7B committed to complete baseline CSO projects = \$4.2B.
- Escalated LTCP costs below = \$3.9B; Recommended Newtown LTCP = \$1.3B.
- Total CSO Program Cost to date is \$4.2B + \$3.9B = \$8.1B
- Additional potential costs for 1 LTCP pending DEC approval and 2 LTCPs to be submitted in 2018.



*The data show that CSO discharges are not a significant source of hazardous substances in Newtown Creek. Nevertheless, the City expects the CSO control alternative selected in this LTCP (see Section 8) would be sufficient to address any CSO discharge controls that EPA may require under Superfund.*

*The City concurs with comments from DEC, dated March 16, 2017, and from EPA, dated May 9, 2017, in which each stated that “[b]iological data from reference areas with CSO point source discharges indicate risk from CERCLA [chemicals of potential concern (COPCs)] as evaluated from these data could be significantly decreased to background (reference area) levels even with continuing CSO discharge during storm events.” (EPA Comments at ES-3, Specific Comment 9; DEC Comments at 4, Specific Comment 1.g).*

*-NYCDEP 2017 Newtown Creek Long Term Control Plan*

- **RI data demonstrates that CSOs are not CERCLA drivers**
- **Next step: coordinate review and approval**